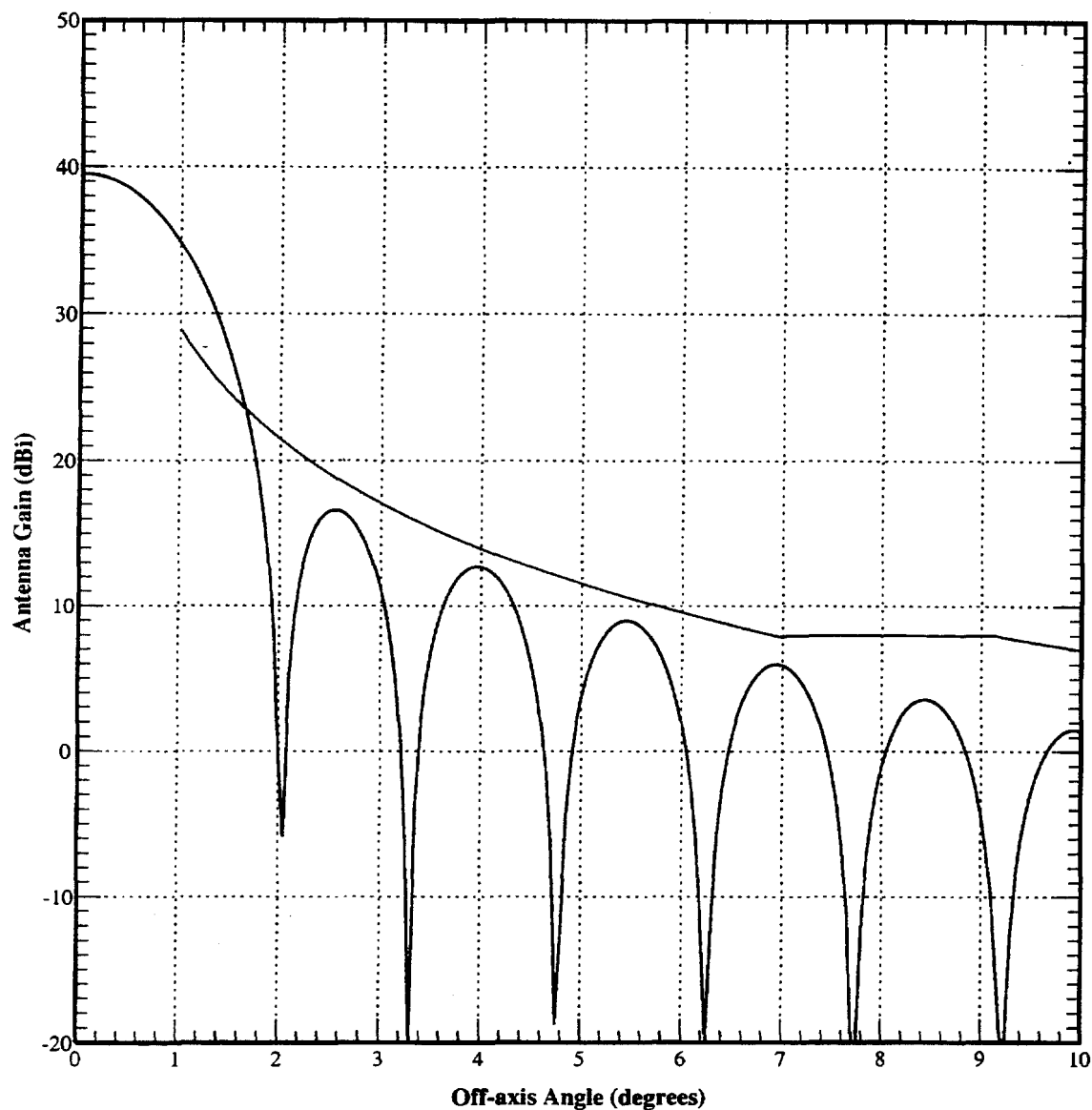


Figure 9: Theoretical Antenna Pattern



Theoretical Circular Aperture Antenna Pattern

Diameter = 1.000 Meter

Frequency = 11.700 GHz

Diameter/Wavelength Ratio = 39.000

COSINE Illumination

3.00 dB Edge Taper

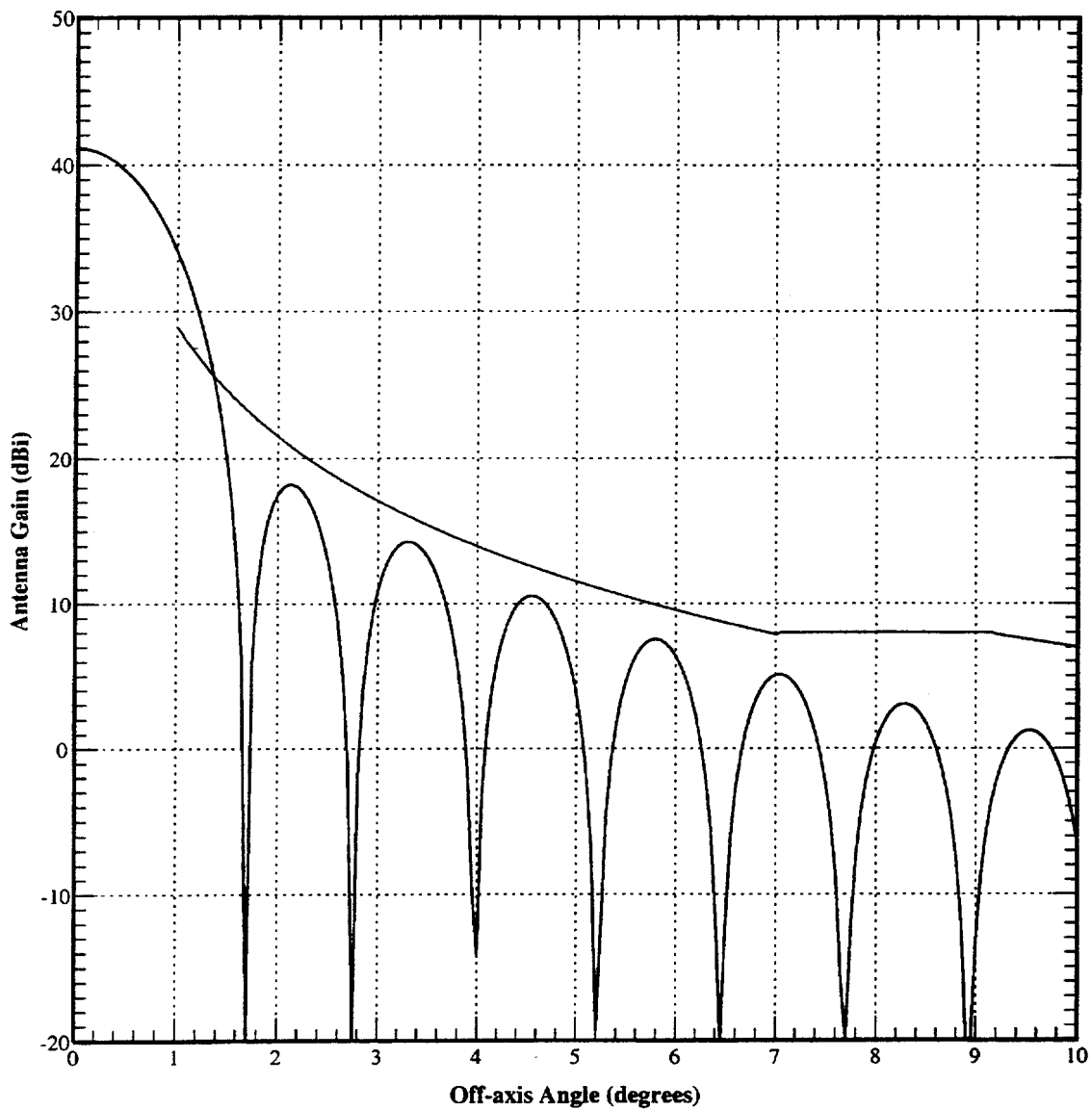
0.00 % Aperture Blockage

Maximum Antenna Gain = 39.546 dBi

Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 10: Theoretical Antenna Pattern



Theoretical Circular Aperture Antenna Pattern

Diameter = 1.000 Meter

Frequency = 14.000 GHz

Diameter/Wavelength Ratio = 46.667

COSINE Illumination

3.00 dB Edge Taper

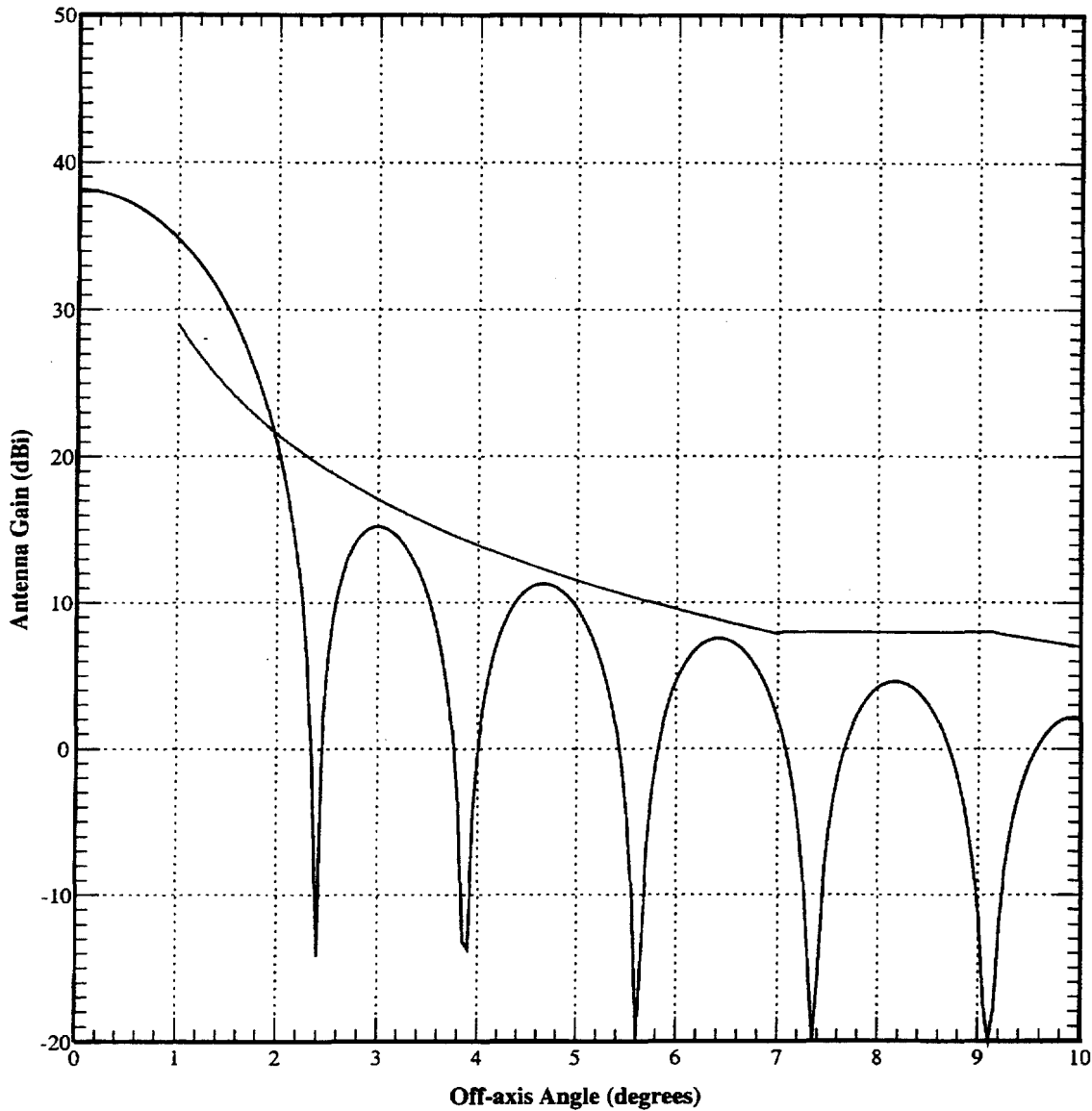
0.00 % Aperture Blockage

Maximum Antenna Gain = 41.105 dBi

Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 11: Theoretical Antenna Pattern



Theoretical Circular Aperture Antenna Pattern

Diameter = 0.850 Meter

Frequency = 11.700 GHz

Diameter/Wavelength Ratio = 33.150

COSINE Illumination

3.00 dB Edge Taper

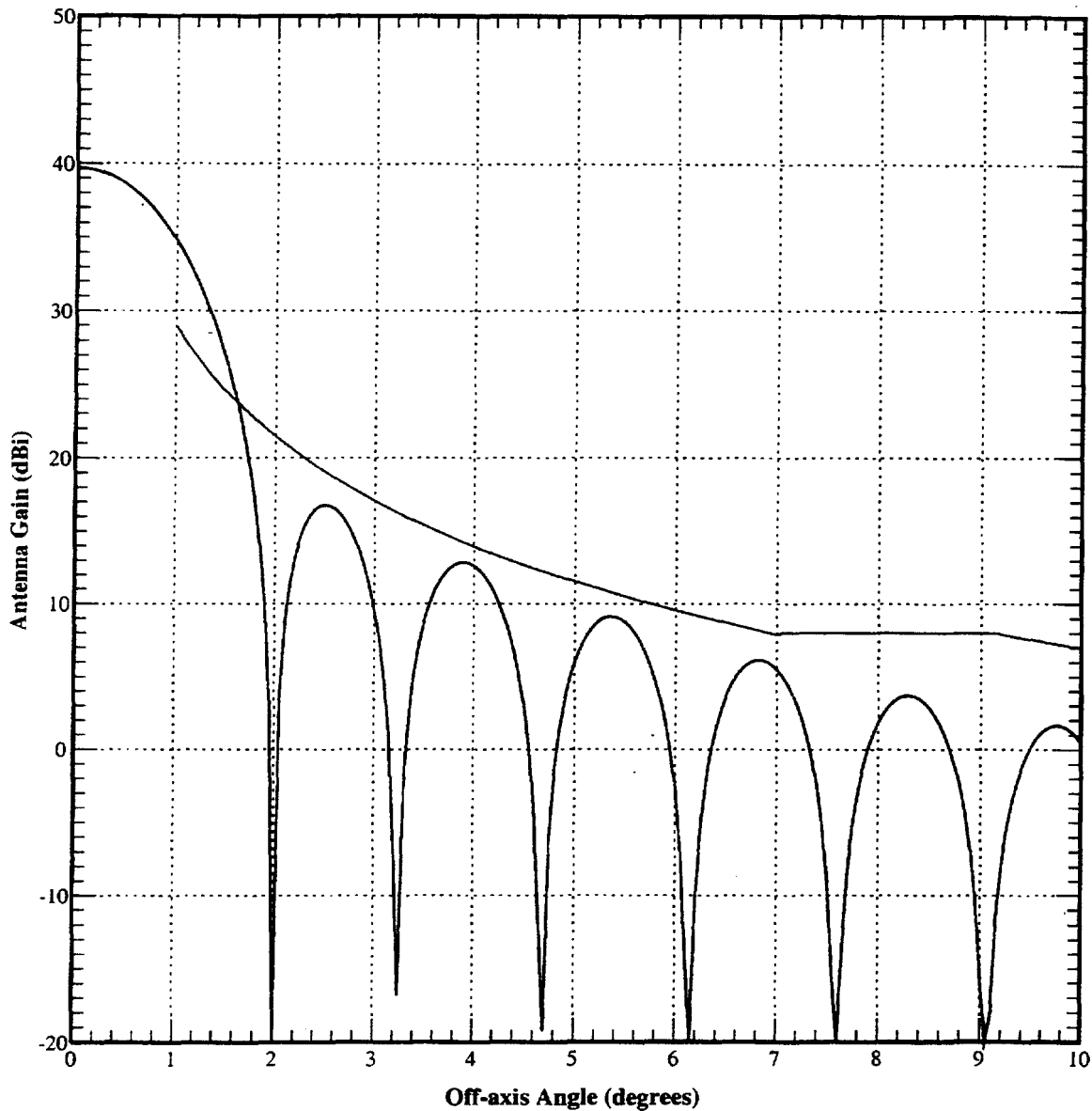
0.00 % Aperture Blockage

Maximum Antenna Gain = 38.134 dBi

Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 12: Theoretical Antenna Pattern



Theoretical Circular Aperture Antenna Pattern

Diameter = 0.850 Meter

Frequency = 14.000 GHz

Diameter/Wavelength Ratio = 39.667

COSINE Illumination

3.00 dB Edge Taper

0.00 % Aperture Blockage

Maximum Antenna Gain = 39.693 dBi

Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

## Appendix B

### Proposed Rule Changes

Title 47 of the Code of Federal Regulations, Part 25, is proposed to be amended as follows:

1. The authority citation for Part 25 continues to read as follows:

Authority: 47 U.S.C. 701-744. Interprets or applies Sections 4, 301, 302, 303, 307, 309, and 332 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 303, 307, 309, 332, unless otherwise noted.

2. Amend §25.103 by revising paragraphs (b) and (c)(2) to read as follows:

§25.103 Definitions.

\* \* \* \* \*

(b) *Authorized carrier*. The term "authorized carrier" means a communications common carrier which is authorized by the Federal Communications Commission under the Communications Act of 1934, as amended, to provide services by means of communications satellites.

(c) \* \* \*

(2) The corporation shall be deemed to be a common carrier within the meaning of section 3(10) of the Communications Act of 1934, as amended.

3. Amend §25.109 by revising paragraph (c) to read as follows:

§25.109 Cross-reference.

\* \* \* \* \*

(c) Ship earth stations in the Maritime Mobile Satellite Service, see 47 CFR part 80.

4. Amend §25.110 by revising paragraphs (a) and (b) to read as follows:

§25.110 Filing of applications, fees, and number of copies.

(a) Standard application forms applicable to this part may be obtained from the Federal Communications Commission, Forms Distribution Center, by calling 1-800-418-FORM (3676).

(b) Manually filed applications for satellite radio station authorizations governed by this part and requiring a fee shall be mailed or hand-delivered to the locations specified in Part 1, subpart G of this chapter. The addresses for filing and fee amounts for the applications are also listed in the International and Satellite services fee filing guide from the Commission's Forms Distribution Center or by calling 1-800-418-

FORM (3676). All other applications shall be submitted to the Secretary, Federal Communications Commission, 445 12<sup>th</sup> Street, S.W., Washington, DC 20554.

5. Amend §25.111 by revising paragraph (b) to read as follows:

§25.111 Additional information.

\* \* \* \* \*

(b) Applicants, permittees and licensees of radio stations governed by this part shall provide the Commission with all information it requires for the Advance Publication, coordination and notification of frequency assignments pursuant to the international Radio Regulations. No protection from interference caused by radio stations authorized by other Administrations is guaranteed unless coordination procedures are timely completed or, with respect to individual administrations, by successfully completing coordination agreements. Any radio station authorization for which coordination has not been completed may be subject to additional terms and conditions as required to effect coordination of the frequency assignments with other Administrations.

6. Amend § 25.113 by revising the section name, revising paragraph (a), and removing and reserving paragraph (b), to read as follows:

§ 25.113 Station licenses and launch authority.

(a) Construction permits are not required for satellite earth stations. Construction of such stations may commence prior to grant of a license at the applicant's own risk. Applicants must comply with the provisions of 47 CFR 1.1312 relating to environmental processing prior to commencing construction.

(b) [Reserved].

\* \* \* \* \*

7. Amend § 25.115 by revising paragraphs (a) and (c) to read as follows:

§ 25.115 Application for earth station authorizations.

(a) Transmitting earth stations. Commission authorization must be obtained for authority to operate a transmitting earth station. Applications shall be filed on FCC Form 312 and include the information specified in §25.130.

\* \* \* \* \*

(c) Large Networks of Small Antennas operating in the 12/14 GHz frequency bands with U.S.-licensed or non-U.S.-licensed satellites for domestic or international services. Applications to license small antenna network systems operating in the 12/14 GHz frequency band under blanket operating authority shall be filed on FCC Form 312 and Schedule B, for each large (5 meters or larger) hub station, and Schedule B for each representative type of small antenna (less than 5 meters) operating within the network.

\* \* \* \* \*

8. Revise Section 25.117 to read as follows:

§25.117 Modification of station license.

(a) Except as provided for in Sec. 25.118 (Modifications not requiring prior authorization), no modification of a radio station governed by this part which affects the parameters or terms and conditions of the station authorization shall be made except upon application to and grant of such application by the Commission.

(b) [Reserved]

(c) Applications for modification of earth station authorizations shall be submitted on FCC Form 312, Main Form and Schedule B, except as set forth in paragraph (e) of this section.

(d) Applications for modifications of space station authorizations shall be filed in accordance with Sec. 25.114, but only those items of information listed in Sec. 25.114(c) that change need to be submitted, provided the applicant certifies that the remaining information has not changed.

(e) Any application for modification of authorization to extend a required date of completion (*e.g.*, begin construction, complete construction, launch, bring into operation) shall be filed on FCC Form 312M (Application for Additional Time to Construct). The application must include a verified statement from the applicant:

(1) That states the additional time is required due to unforeseeable circumstances beyond the applicant's control, describes these circumstances with specificity, and justifies the precise extension period requested; or

(2) That states there are unique and overriding public interest concerns that justify an extension, identifies these interests and justifies a precise extension period.

(f) Applications for modification of earth station authorizations shall be submitted on FCC Form 312, Main Form and Schedule B, whenever the resulting radiofrequency emissions that would be caused by the modification would cause the power density in a given area to exceed five percent of the radiofrequency exposure limits, such that an environmental assessment statement would be required under Section 1.1307(b)(3)(i) of this Title.

9. Revise Section 25.118 to read as follows:

§25.118 Modifications not requiring prior authorization.

(a) *Notification Required.* Authorized earth station operators may make the following modifications to their licenses without prior Commission authorization, provided that the operators notify the Commission, using FCC Form 312 and Schedule B, within 30 days of the modification:

(1) Licensees may make changes to their authorized earth stations without obtaining prior Commission authorization, provided that they have complied with all applicable frequency coordination procedures in accordance with § 25.251, and the modification does not involve:

(i) An increase in EIRP or EIRP density (both main lobe and side lobe);

(ii) An increase in transmitted power;

(iii) A change in coordinates of more than 1 second in latitude or longitude for stations operating in frequency bands that are shared with terrestrial systems; or

(iv) A change in coordinates of 10 seconds or greater in latitude or longitude for stations operating in frequency bands that are not shared with terrestrial systems.

(v) A change in operations from private carrier to common carrier status.

(2) Equipment in an authorized earth station may be replaced without prior authorization if the new equipment is electrically identical to the existing equipment.

(3) Authorized VSAT earth station operators may add VSAT remote terminals without prior authorization, provided that they have complied with all applicable frequency coordination procedures in accordance with § 25.251, and such modifications do not require prior authorization under § 25.121(e)(3) of this part. (VSAT hub earth stations and all remote terminals that are not part of a U.S.-licensed VSAT network are treated like other earth stations for purposes of determining whether they can be modified without prior authorization.)

(b) *Notification not required.* An authorized earth station licensee may add, change or replace transmitters or antenna facilities without prior authorization, provided:

(1) The added, changed, or replaced facilities conform to Section 25.209 of this Chapter;

(2) The particulars of operations remain unchanged;

(3) Frequency coordination is not required; and

(4) The maximum power and power density delivered into any antenna at the earth station site shall not exceed the values calculated by subtracting the maximum antenna gain specified in the license from the maximum authorized e.i.r.p. and e.i.r.p. density values.

10. Amend § 25.121 by revising paragraphs (a), (c), and (e) to read as follows:

§ 25.121 License term and renewals.

(a) *License Term.* Except as provided in paragraphs (b) and (c) of this section, licenses for facilities governed by this part will be issued for a period of 10 years.

\* \* \* \* \*

(c) *Earth Stations.* For earth stations, the license term will be specified in the instrument of authorization. In no case shall this term exceed 15 years.

\* \* \* \* \*

(e)(1) *Renewal of licenses.* Applications for renewals of earth station licenses must be submitted on FCC Form 312R no earlier than 90 days, and no later than 30 days, before the expiration date of the license. Applications for space station system replacement authorization for non-geostationary orbit satellites shall be filed no earlier than 90 days, and no later than 30 days, prior to the end of the seventh year of the existing license term.

(2) In addition to the requirements of paragraph (e)(1) of this section, applicants seeking renewal of a MET license must include as an attachment to FCC Form 312R a statement of the number of MET units in its network placed into operation.

(3) In addition to the requirements of paragraph (e)(1) of this section, applicants seeking renewal of a VSAT license must include as an attachment to FCC Form 312R a statement of the number of VSAT units in its network placed into operation. If a VSAT licensee does not bring all the VSAT units specified in its license into operation by the time the licensee is renewed, subsequent modification applications to add VSAT units will require prior Commission authorization.

11. Amend § 25.130 by revising paragraph (a) to read as follows:



§ 25.130 Filing requirements for transmitting earth stations.

(a) Applications for a new or modified transmitting earth station facility shall be submitted on FCC Form 312, Main Form and Schedule B, accompanied by any required exhibits. In addition, the applicant shall submit the following information to be used as an "informative" in the public notice issued under Section 25.151 of this part:

- (1) A detailed description of the service to be provided, including frequency bands and satellites to be used.
- (2) The diameter of the antenna.
- (3) Proposed power and power density levels.
- (4) Identification of any random access technique, if applicable, as listed in Section 25.134(a) in this Chapter.
- (5) Identification of any rule or rules for which a waiver is requested.

12. Amend § 25.131 by revising paragraphs (a), (b), (h), (i), and (j) to read as follows:

§ 25.131 Filing requirements for receive-only earth stations.

(a) Except as provided in paragraphs (b) and (j) of this section, applications for a license for a receive-only earth station shall be submitted on FCC Form 312, Main Form and Schedule B, accompanied by any required exhibits and the information described in Sections 25.130(a)(1) through (5) of this chapter.

(b) Except as provided in paragraph (j) of this section, receive-only earth stations in the fixed-satellite service that operate with U.S.-licensed satellites may be registered with the Commission in order to protect them from interference from terrestrial microwave stations in bands shared co-equally with the fixed service in accordance with the procedures of § 25.203 and § 25.251 of this part.

\* \* \* \* \*

(h) Registration term: Registrations for receive-only earth stations governed by this section will be issued for a period of 15 years from the date on which the application was filed. Applications for renewals of registrations must be submitted on FCC Form 312R (Application for Renewal of Radio Station License in Specified Services) no earlier than 90 days and no later than 30 days before the expiration date of the registration.

(i) Applications for modification of license or registration of receive-only earth stations shall be made in conformance with Sections 25.117 and 25.118 of this part. In addition, registrants are required to notify the Commission when a receive-only earth station is no longer operational or when it has not been used to provide any service during any 6-month period.

(j) Receive-only earth stations operating with non-U.S. licensed space stations shall file an FCC Form 312 requesting a license or modification to operate such station. Receive-only earth stations used to receive INTELNET I service from INTELSAT space stations need not file for licenses. See Deregulation of Receive-Only Satellite Earth Stations Operating with the INTELSAT Global Communications Satellite System, Declaratory Ruling, RM No. 4845, FCC 86-214 (released May 19, 1986) available through the International Reference Center, FCC, identified in Section 0.453(m) of this Title.

13. Amend § 25.132 by revising paragraph (a) and adding new paragraph (b)(3) to read as follows:

§ 25.132 Verification of earth station antenna performance standards.

(a) All applications for transmitting earth stations must be accompanied by a certificate pursuant to § 2.902 of the chapter from the manufacturer of each antenna that the results of a series of radiation pattern tests performed on representative equipment in representative configurations by the manufacturer demonstrates that the equipment complies with the performance standards set forth in § 25.209. The licensee must be prepared to demonstrate the measurements to the Commission on request.

\* \* \* \* \*

(b) \* \* \*

(3) Applicants seeking authority to use an antenna that does not meet the standards set forth in Sections 25.209(a) and (b) of this Chapter, pursuant to the procedure set forth in Section 25.220 of this Chapter, are required to submit a copy of the manufacturer's range test plots of the antenna gain patterns specified in paragraph (b)(1) of this section.

14. Amend § 25.133 by revising paragraphs (a) and (b) and adding paragraph (e) to read as follows:

§ 25.133 Period of construction; certification of commencement of operation.

(a)(1) Each license for an earth station governed by this part, except for mobile satellite earth station terminals (METs), shall specify as a condition therein the period in which construction of facilities must be completed and station operation commenced. Construction of the earth station must be completed and the station must be brought into operation within 12 months from the date of the license grant except as may be determined by the Commission for any particular application.

(2) Each license for mobile satellite earth station terminals (METs) shall specify as a condition therein the period in which station operation must be commenced. The networks in which the METs will be operated must be brought into operation within 12 months from the date of the license grant except as may be determined by the Commission for any particular application.

(b)(1) Each license for a transmitting earth station included in this part shall also specify as a condition therein that upon the completion of construction, each licensee must file with the Commission a certification containing the following information:

- (i) The name of the licensee;
- (ii) File number of the application; call sign of the antenna;
- (iii) Date of the license;
- (iv) A certification that the facility as authorized has been completed and that each antenna facility has been tested and is within 2 dB of the pattern specified in Sec. 25.209, Sec. 25.135 (NVNG MSS earth stations), or Sec. 25.213 (1.6/2.4 GHz Mobile-Satellite Service earth stations). MET licenses shall specify as a condition that the licensee must file a certification that it has begun to provide service;
- (v) The date on which the station became operational; and
- (vi) A statement that the station will remain operational during the license period unless the license is submitted for cancellation.

(2) For stations authorized under Sec. 25.115(c) of this part (Large Networks of Small Antennas operating in the 12/14 GHz bands) and Sec. 25.115(d) of this part (User Transceivers in the Mobile-

Satellite Service), and for mobile satellite earth station terminals (METs), a certificate must be filed when the network is put into operation.

\* \* \* \* \*

(d) An application for MET authorization shall be filed on FCC Form 312, Main Form and Schedule B. A MET licensee applying to renew its license must follow the procedures provided in § 25.121(e)(2) of this part.

15. Amend § 25.134 by revising paragraphs (a), (b), and (d) to read as follows:

§ 25.134 Licensing provisions of very small aperture terminal (VSAT) networks.

(a) All applications for VSAT service in the 12/14 GHz band that meet the following requirements will be routinely processed:

(1) The maximum transmitter power spectral density of a digital modulated carrier into any GSO FSS earth station antenna shall not exceed  $-14.0 - 10\log(N)$  dB(W/4 kHz).

(i) For a VSAT network using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.

(ii) For a VSAT network using code division multiple access (CDMA) technique, N is the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam.

(iii) For a VSAT network using contention Aloha multiple access technique, N is equal to two.

(iv) For a VSAT network using contention CDMA/Aloha multiple access technique, N is twice the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite-receiving beam without contention.

(2) The maximum GSO FSS satellite EIRP spectral density of the digital modulated emission shall not exceed 6 dB (W/4kHz) for all methods of modulation and accessing techniques.

(3) The maximum hub earth station EIRP shall not exceed 78.3 dBW for all methods of multiple access techniques and supporting VSAT network identified in paragraph (a)(1) of this section.

(4) The maximum transmitter power spectral density of an analog carrier into any GSO FSS earth station antenna shall not exceed  $-8.0$  dB(W/4kHz) and the maximum GSO FSS satellite EIRP spectral density shall not exceed  $+13.0$  dB(W/4kHz).

(b) Each applicant for digital and/or analog VSAT network authorization proposing to use transmitted satellite carrier EIRP densities and/or maximum antenna input power in excess of those specified in paragraph (a) of this Section must comply with the procedures set forth in § 25.220 of this Chapter.

\* \* \* \* \*

(d) An application for VSAT authorization shall be filed on FCC Form 312, Main Form and Schedule B. A VSAT licensee applying to renew its license must follow the procedures provided in § 25.121(e)(3) of this part.

16. Amend § 25.138 by adding language at the end of paragraphs (a)(1) and (a)(2) to read as follows:

§ 25.138 Blanket licensing provisions of GSO FSS earth stations in the 18.58-18.8 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 28.35-28.6 GHz (Earth-to-space) and 29.5-30.0 GHz (Earth-to-space) bands.

(a) \* \* \*

(1) \* \* \* N = two for Aloha systems. N = 2 times the likely maximum number of co-frequency simultaneously transmitting earth stations in the receive beam of the satellite for CDMA/Aloha systems.

(2) \* \* \* N = two for Aloha systems. N = 2 times the likely maximum number of co-frequency simultaneously transmitting earth stations in the receive beam of the satellite for CDMA/Aloha systems.

§ 25.141

17. Remove §25.141.

§ 25.144

18. Remove and reserve paragraph §25.144(a)(1).

19. Amend § 25.151 by revising paragraphs (c)(2) and (d), and adding new paragraph (e) to read as follows:

§ 25.151 Public notice period.

\* \* \* \* \*

(c) \* \* \*

(2) For temporary authorization pursuant to § 25.120 of this Chapter.

(d) Except as specified in paragraph (e) of this section, no application that has appeared on public notice will be granted until the expiration of a period of thirty days following the issuance of the public notice listing the application, or any major amendment thereto. Any comments or petitions must be delivered to the Commission by that date in accordance with §25.154.

(e)(1) Applicants seeking authority to operate a temporary fixed earth station pursuant to §25.277 of this part may consider their applications "provisionally granted," and may initiate operations upon the placement of the complete FCC Form 312 application on public notice, provided that

(i) The temporary fixed earth station will operate only in the conventional Ku-band;

(ii) The temporary fixed earth station's operations will be consistent with all routine-licensing requirements for the conventional Ku-band; and

(iii) The temporary fixed earth station's operations will be limited to satellites on the Permitted Space Station List.

(2) Applications for authority granted pursuant to paragraph (e)(1) of this section shall be placed on public notice pursuant to paragraph (a)(1) of this section. If no comments or petitions are filed within 30 days of the public notice date, the authority granted will be considered a regular temporary fixed earth station authorization as of 30 days after the public notice date. If a comment or petition is filed within 30 days of the public notice date, the applicant must suspend operations immediately pending resolution of the issues raised in that comment or petition.

20. Amend § 25.154 by revising paragraphs (c) and (d) and adding paragraph (e) to read as follows:

§ 25.154 Oppositions to applications and other pleadings.

\* \* \* \* \*

(c) Except for opposition to petitions to deny an application filed pursuant to § 25.220 of this Chapter, oppositions to petitions to deny an application or responses to comments and informal objections may be filed 10 days after the petition, comment, or objection is filed and must be in accordance with other applicable provisions of §§ 1.41 through 1.52 of this chapter.

(d) Except for opposition to petitions to deny an application filed pursuant to § 25.220 of this Chapter, reply comments by the party that filed the original petition may be filed with respect to pleadings filed pursuant to paragraph (c) of this section within 5 days after the time for filing oppositions has expired unless the Commission otherwise extends the filing deadline and must be in accordance with other applicable provisions of §§ 1.41 through 1.52 of this chapter.

(e) If petition to deny an application filed pursuant to § 25.220 of this Chapter is filed, the applicant must file a statement with the Commission explaining whether the applicant has resolved all outstanding coordination issues raised by the petitioner, within 30 days of the date the petition for deny is filed. This statement must be in accordance with the provisions of §§ 1.41 through 1.52 of this chapter applicable to oppositions to petitions to deny.

21. Revise § 25.201 to read as follows:

§25.201 Definitions.

(a) Definitions for terms in subpart C of this part appear in paragraph (b) of this section, and in Section 2.1 of this Chapter.

(b)(1) *Active satellite*. An earth satellite carrying a station intended to transmit or re-transmit radiocommunication signals.

(2) *Base Earth Station*. An earth station in the fixed-satellite service or, in some cases, in the land mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the land mobile-satellite service. (RR)

(3) *C-band*. For purposes of this part, the C-band refers specifically to the 3700-4200 MHz downlink and 5925-6425 MHz uplink frequency bands. These paired bands are allocated to the Fixed-Satellite Service and are also referred to as the 4/6 GHz band(s).

(4) *Coordination distance*. For the purposes of this part, the expression "coordination distance" means the distance from an earth station, within which there is a possibility of the use of a given transmitting frequency at this earth station causing harmful interference to stations in the fixed or mobile service,

sharing the same band, or of the use of a given frequency for reception at this earth station receiving harmful interference from such stations in the fixed or mobile service.

(5) *Earth station*. A station located either on the Earth's surface or within the major portion of the Earth's atmosphere intended for communication:

(i) With one or more space stations; or

(ii) With one or more stations of the same kind by means of one or more reflecting satellites or other objects in space.

(6) *Electronic filing*. The submission of applications, exhibits, pleadings, or other filings to the Commission in an electronic form using *Internet* or *World Wide Web* on-line filing forms.

(7) *Equivalent diameter*. When circular aperture reflector antennas are employed, the size of the antenna is generally expressed as the diameter of the antenna's main reflector. When non-reflector or non-circular aperture antennas are employed, an equivalent diameter can be computed for the antenna. The equivalent diameter is the diameter of a hypothetical circular aperture antenna with the same aperture area as the actual antenna. For example, an elliptical aperture antenna with major axis,  $a$ , and minor axis,  $b$ , will have an equivalent diameter of  $[a \times b]^{1/2}$ . A rectangular aperture antenna with length,  $l$ , and width,  $w$ , will have an equivalent diameter of  $[(l \times w)/\pi]^{1/2}$ .

(8) *Fixed earth station*. An earth station intended to be used at a specified fixed point.

(9) *Fixed-Satellite Service*. A radiocommunication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within

specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the inter-satellite service; the fixed-satellite service may also include feeder links of other space radiocommunication services. (RR)

(10) *Full transponder*. Radio emissions or transmissions that occupy, or nearly occupy, the entire satellite transponder. C-band and Ku-band satellite systems typically have transponder bandwidths on the order of 36 MHz or more. Single carrier full transponder transmissions can include full motion analog video, thousands of multiplexed voice channels, or high data rates on the order of 50 Mb/s.

(11) *Geostationary satellite*. A geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a satellite which remains approximately fixed relative to the Earth.

(12) *Inter-Satellite Service*. A radiocommunication service providing links between artificial earth satellites.

(13) *Ku-band*. In this rule part, the Ku-band refers specifically to the 11700-12200 MHz downlink and 14000-14500 MHz uplink frequency bands. These paired bands are allocated to the Fixed-Satellite Service and are also referred to as the 12/14 GHz band(s).

(14) *Land Earth Station*. An earth station in the fixed-satellite service or, in some cases, in the mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the mobile-satellite service. (RR)

(15) *Land Mobile Earth Station*. A mobile earth station in the land mobile-satellite service capable of surface movement within the geographical limits of a country or continent. (RR)

(16) *Mobile earth station*. An earth station intended to be used while in motion or during halts at unspecified points.

(17) *Mobile-Satellite Service*. A radiocommunication service:

(i) Between mobile earth stations and one or more space stations, or between space stations used by this service; or

(ii) Between mobile earth stations, by means of one or more space stations.

This service may also include feeder links necessary for its operation. (RR)

(18) *Narrowband*. Radio emissions or transmissions with narrow or limited spectral bandwidths. Narrowband satellite transmissions generally provide a single channel or a very limited number of channels. Narrowband satellite transmissions generally have bandwidths of 40 kHz to 5 MHz.

- (19) *Non-Voice, Non-Geostationary Mobile-Satellite Service*. A mobile-satellite service reserved for use by non-geostationary satellites in the provision of non-voice communications which may include satellite links between land earth stations at fixed locations.
- (20) *1.6/2.4 GHz Mobile-Satellite Service*. A mobile-satellite service that operates in the 1610-1626.5 MHz and 2483.5-2500 MHz frequency bands, or in any portion thereof.
- (21) *Passive satellite*. An earth satellite intended to transmit radio communication signals by reflection.
- (22) *Permitted Space Station List*. A list of satellites including all U.S.-licensed satellites and those non-U.S.-licensed satellites for which the Commission has authorized U.S.-licensed earth stations to communicate with that satellite, and the satellite operator has requested the Commission to place its satellite on the Permitted Space Station List.
- (23) *Power flux density*. The amount of power flow through a unit area within a unit bandwidth. The units of power flux density are those of power spectral density per unit area, namely watts per hertz per square meter. These units are generally expressed in decibel form as dB(W/Hz/m<sup>2</sup>), dB(W/m<sup>2</sup>) in a 4 kHz band, or dB(W/m<sup>2</sup>) in a 1 MHz band.
- (24) *Power spectral density*. The amount of an emission's transmitted carrier power falling within the stated reference bandwidth. The units of power spectral density are watts per hertz and are generally express in decibel form as dB(W/Hz), dB(W/4kHz), or dB(W/1MHz).
- (25) *Protection areas*. The geographic regions on the surface of the Earth where United States Department of Defense ("DoD") meteorological satellite systems or National Oceanic and Atmospheric Administration ("NOAA") meteorological satellite systems, or both such systems, are receiving signals from low earth orbiting satellites.
- (26) *Radiodetermination-Satellite Service*. A radiocommunication service for the purpose of radiodetermination involving the use of one of more space stations. This service may also include feeder links necessary for its own operation. (RR)
- (27) *Routine processing or licensing*. A licensing process whereby applications are processed in an expedited fashion. Such applications must be complete in all regards and consistent with all Commission Rules and must not raise any policy issues. With respect to earth station licensing, an application is "routine" only if it conforms to all antenna, power, coordination, radiation hazard, and FAA notification rules, and accesses only "Permitted Space Station List" satellites in the C-band or Ku-band frequency bands.
- (28) *Satellite Digital Audio Radio Service ("DARS" or "SDARS")*. A radiocommunication service in which audio programming is digitally transmitted by one or more space stations directly to fixed, mobile, and/or portable stations, and which may involve complementary SDARS repeaters, telemetry, tracking and control facilities.
- (29) *Satellite system*. A space system using one or more artificial earth satellites.
- (30) *Spacecraft*. A man-made vehicle which is intended to go beyond the major portion of the Earth's atmosphere.
- (31) *Space operation service*. A radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry and space telecommand. These functions will normally be provided within the service in which the space station is operating.
- (32) *Space radiocommunication*. Any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space.
- (33) *Space station*. A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.
- (34) *Space system*. Any group of cooperating earth stations and/or space stations employing space radiocommunication for specific purposes.
- (35) *Space telecommand*. The use of radiocommunication for the transmission of signals to a space station to initiate, modify or terminate function of the equipment on a space object, including the space station.
- (36) *Space telemetering*. The use of telemetering for the transmission from a space station of results of measurements made in a spacecraft, including those relating to the functioning of the spacecraft.

(37) *Space tracking*. Determination of the orbit, velocity or instantaneous position of an object in space by means of radiodetermination, excluding primary radar, for the purpose of following the movement of the object.

(38) *Temporary fixed earth station*. An earth station operating in the Fixed Satellite Service at a fixed location for less than 6 months. Temporary fixed earth stations are transportable facilities that are moved to the point of operation before communicating. They are often used for emergency restoration of service and news gathering functions. Temporary fixed earth stations do not operate while in motion.

(39) *Terrestrial radiocommunication*. Any radiocommunication other than space radiocommunication or radio astronomy.

(40) *Terrestrial station*. A station effecting terrestrial radiocommunication.

(41) *Wideband*. See *Full Transponder*.

22. Amend § 25.202 by removing and reserving paragraph (a)(2) to read as follows:

§ 25.202 Frequencies, frequency tolerance and emission limitations.

\* \* \* \* \*

(2) [Reserved.]

\* \* \* \* \*

23. In §25.204, revise paragraphs (a) and (b) to read as follows:

§ 25.204 Power limits.

(a) In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

+40 dBW in any 4 kHz band for  $\theta < 0^\circ$

+40+3  $\theta$  dBW in any 4 kHz band for  $0^\circ < \theta \leq 5^\circ$

where  $\theta$  is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

(b) In bands shared coequally with terrestrial radio-communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station operating in frequency bands above 15 GHz shall not exceed the following limits except as provided for in paragraph (c) of this section:

+64 dBW in any 1 MHz band for  $\theta < 0^\circ$

+64+3  $\theta$  dBW in any 1 MHz band for  $0^\circ < \theta < 5^\circ$

where  $\theta$  is as defined in paragraph (a) of this section.



24. In § 25.209, revise paragraph (f) to read as follows:

§25.209 Antenna performance standards.

\* \* \*

(f) An earth station with an antenna not conforming to the standards of paragraphs (a) and (b) of this section will be authorized after February 15, 1985 upon finding by the Commission that unacceptable levels of interference will not be caused under conditions of uniform 2° orbital spacing. An earth station antenna initially authorized on or before February 15, 1985 will be authorized by the Commission to continue to operate as long as such operations are found not to cause unacceptable levels of adjacent satellite interference. In either case, the Commission will impose appropriate terms and conditions in its authorization of such facilities and operations. The applicant has the burden of demonstrating that its antenna not conforming to the standards of paragraphs (a) and (b) of this section will not cause unacceptable interference. This demonstration must comply with the procedures set forth in § 25.220 of this Chapter.

25. In § 25.211, revise paragraph (d) and add paragraphs (e), (f), and (g) to read as follows:

§25.211 Video transmissions in the Fixed-Satellite Services.

\* \* \* \* \*

(d) An earth station may be routinely licensed for transmission to full transponder services provided:

- (1) In the 6 GHz band, with an antenna equivalent diameter 4.5 meters or greater, the maximum power into the antenna does not exceed 26.5 dBW; or
- (2) In the 14 GHz band, with an antenna equivalent diameter 1.2 meters or greater, the maximum power into the antenna does not exceed 27 dBW.

(e) Antennas with an equivalent diameter smaller than those specified in paragraph (d) of this section are subject to the provisions of Section 25.220 of this Chapter, which may include power reduction requirements. These antennas will not be routinely licensed for transmission of full transponder services.

(f) Each applicant for authorization for video transmissions in the fixed-satellite service proposing to use transmitted satellite carrier EIRP densities, and/or maximum power into the antenna in excess of those specified in Section 25.211(d), must comply with the procedures set forth in § 25.220 of this Chapter.

(g) The Commission has authority to apply the power level limits in this section to earth station applications for authority to operate in any other FSS frequency band to the extent it deems necessary to prevent unacceptable interference into adjacent satellite systems, to the extent that power limits have not been established elsewhere in this Part.

26. In § 25.212, revise paragraph (c) by adding language to the end of the paragraph, redesignate paragraph (d) as paragraph (d)(1), adding language to the end of paragraph (d)(1), and adding new paragraphs (d)(2), (e), and (f) to read as follows:

§ 25.212 Narrowband transmissions in the Fixed-Satellite Service.

(c) \* \* \* Antennas with an equivalent diameter smaller than 1.2 meters in the 14 GHz band are subject to the provisions of §25.220 of this chapter, which may include power reduction requirements.

(d)(1) \* \* \* Antennas with an equivalent diameter smaller than 1.2 meters in the 14 GHz band are subject to the provisions of §25.220 of this chapter, which may include power reduction requirements.

(d)(2) In the 6 GHz band, an earth station with an equivalent diameter antenna of 4.5 meters or greater may be routinely licensed for transmission of SCPC services if the maximum power spectral densities into the antenna do not exceed + 0.5 dB(W/4kHz) for analog SCPC carriers with bandwidths up to 200 kHz and do not exceed  $-2.7 - 10\log(N)$  dB (W/4kHz) for narrow and/or wideband digital SCPC carriers.

(i) For digital SCPC using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.

(ii) For digital SCPC using code division multiple access (CDMA) technique, N is the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam.

(iii) For digital SCPC using contention Aloha multiple access technique, N is equal to two.

(iv) For digital SCPC using contention CDMA/Aloha multiple access technique, N is twice the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite-receiving beam without contention.

(e) Each applicant for authorization for narrowband transmissions in the fixed-satellite service proposing to use transmitted satellite carrier EIRP densities, and/or maximum antenna input power densities in excess of those specified in paragraph (c) of this Section for Ku-band service, or paragraph (d) of this Section for C-band service, respectively, must comply with the procedures set forth in § 25.220 of this Chapter.

(f) The Commission has authority to apply the power level limits in this section to earth station applications for authority to operate in any other FSS frequency band to the extent it deems necessary to prevent unacceptable interference into adjacent satellite systems, to the extent that power limits have not been established elsewhere in this Part.

27. Revise Part 25 by adding new § 25.220 to read as follows:

§ 25.220 Non-conforming transmit/receive earth station operations.

(a)(1) This section applies to earth station applications in which:

(i) the proposed antenna does not conform to the standards of §25.209(a) and (b) of this Chapter, and/or

(ii) the proposed power density levels are in excess of those specified in §25.134, §25.211, or §25.212 of this Chapter, or those derived by the procedure set forth in paragraph (c)(1) of this Section, whichever is applicable.

(2) Paragraphs (b) through (e) of this section apply to the earth station applications described in paragraph (a)(1) of this section, in which the applicant seeks transmit/receive authority.

(3) Paragraph (f) of this section applies to the earth station applications described in paragraph (a)(1) of this section in which the applicant seeks transmit-only or receive-only authority.

(4) The requirements for petitions to deny applications filed pursuant to this section are set forth in Section 25.154 of this Chapter.

(b) If an antenna proposed for use by the applicant does not comply with the antenna performance standards contained in §25.209(a) and (b), the applicant must provide, as an exhibit to its FCC Form 312 application, the antenna gain patterns specified in §25.132(b) of this Chapter.

(c) If an antenna proposed for use by the applicant does not comply with the performance standards contained in §25.209(a) and (b), the applicant must meet the requirements of either paragraph (c)(1) or (c)(2) of this Section to obtain protection from receiving interference from adjacent satellite operators. The applicant must meet the requirements of either paragraph (c)(1) or (c)(3) of this Section to obtain authority to transmit.

(1) The applicant must provide in its Form 312, Schedule B, the power and power density levels that result by reducing the values stated in §25.134, §25.211, or §25.212, whichever is applicable, by the number of decibels that the non-compliant antenna fails to meet the antenna performance standard of §25.209(a) and (b), or

(2) The applicant will not receive protection from adjacent satellite interference from any satellite unless the applicant has provided the affidavits listed in paragraph (d)(1) of this Section from the operator of that satellite(s).

(3) The applicant will not be permitted to transmit to any satellite unless the applicant has provided the affidavits listed in paragraph (e)(1) of this Section from the operator of that satellite(s).

(d)(1) If an antenna proposed for use by the applicant does not comply with the performance standards contained in §25.209(a) and (b), the applicant must submit the affidavits listed in paragraphs (d)(1)(i) through (d)(1)(iv) of this Section to qualify for protection from receiving interference from other satellite systems. The applicant will be granted protection from receiving interference only with respect to the satellite systems included in the coordination agreements referred to in the affidavit required by paragraph (d)(1)(ii) of this section, and only to the extent that protection from receiving interference is afforded by those coordination agreements.

(i) a statement from the satellite operator acknowledging that the proposed operation of the subject non-conforming earth station with its satellite(s) has the potential to receive interference from adjacent satellite networks that may be unacceptable.

(ii) a statement from the satellite operator that it has coordinated the operation of the subject non-conforming earth station accessing its satellite(s), including its required downlink power density based on the information contained in the application, with all adjacent satellite networks within 6° of orbital separation from its satellite(s), and the operations will not violate any existing coordination agreement for its satellite(s) with other satellite systems.

(iii) a statement from the satellite operator that it will include the subject non-conforming earth station operations in all future satellite network coordinations, and

(iv) a statement from the Earth station applicant certifying that it will comply with all coordination agreements reached by the satellite operator(s).

(2) A license granted pursuant to paragraph (d)(1) of this section will include, as a condition on that license, that if no good faith agreement can be reached between the satellite

operator and the operator of a future 2° compliant satellite, the earth station operator shall accept the power density levels that would accommodate the 2° compliant satellite.

(e)(1) An earth station applicant proposing to use transmitted satellite carrier EIRP densities, and/or maximum power into the antenna in excess of the levels in §25.134, §25.211, §25.212, or the power density levels derived through the procedure set forth in paragraph (c)(1) of this Section, whichever is applicable, shall provide the following affidavits as an exhibit to its earth station application:

(i) a statement from the satellite operator acknowledging that the proposed operation of the subject non-conforming earth station with its satellite(s) has the potential to create interference to adjacent satellite networks that may be unacceptable.

(ii) a statement from the satellite operator that it has coordinated the operation of the subject non-conforming Earth Station accessing its satellite(s), and its corresponding downlink power density requirements (based on the information contained in the application) with all adjacent satellite networks within 6° of orbital separation from its satellite(s), and the operations will not violate any existing coordination agreement for its satellite(s) with other satellite systems.

(iii) a statement from the satellite operator that it will include the subject non-conforming Earth Station power and power densities in all future satellite network coordinations, and

(iv) a statement from the Earth station applicant certifying that it will comply with all coordination agreements reached by the satellite operator(s).

(2) A license granted pursuant to paragraph (e)(1) of this section will include, as a condition on that license, that if no good faith agreement can be reached between the satellite operator and the operator of a future 2° compliant satellite, the earth station operator shall reduce its power to those levels that would accommodate the 2° compliant satellite.

(f)(1) If an earth station applicant requests transmit-only authority, and its proposed antenna does not conform to the standards of §25.209(a) and (b) of this Chapter, it must meet the requirements of paragraphs (b) and (c) of this section.

(2) If an earth station applicant requests transmit-only authority, and its proposed power density levels are in excess of those specified in §25.134, §25.211, or §25.212 of this Chapter, or those derived by the procedure set forth in paragraph (c)(1) of this section, it must meet the requirements of paragraph (e) of this section.

(3) If an earth station applicant requests receive-only authority, and its proposed antenna does not conform to the standards of §25.209(a) and (b) of this Chapter, it must meet the requirements of paragraphs (b) and (d) of this section.

28. In § 25.274, revise paragraph (g) to read as follows:

§25.274 Procedures to be followed in the event of harmful interference.

\* \* \* \* \*

(g) Where the earth station suspected of causing interference to the operations of another earth station cannot be identified or is identified as an earth station operating on a satellite system other than the one on which the earth station suffering undue interference is operating, it is the responsibility of a representative

of the earth station suffering harmful interference to contact the control center of other satellite systems. The operator of the earth station suffering undue interference is free to choose any representative to make this contact, including but not limited to the operator of the satellite system on which the earth station is operating. The operator of the earth station suffering undue interference is also free to contact the control center of the other satellite systems directly.

29. Amend § 25.277 by adding paragraph (f) to read as follows:

§25.277 Temporary fixed earth station operations.

\* \* \* \* \*

(f) Filing requirements concerning applications for new temporary fixed earth station facilities operating in frequency bands shared co-equally with terrestrial fixed stations.

(1) When the initial location of the temporary fixed earth station's operation is known, the applicant shall provide, as part of the Form 312 application, a frequency coordination report in accordance with §25.203 for the initial station location.

(2) When the initial location of the temporary fixed earth station's operation is not known at the time the application is filed, the applicant shall provide, as part of the Form 312 application, a statement by the applicant acknowledging its coordination responsibilities under §25.277.

30. Subpart H  
Remove Subpart H

**Appendix C**

\*\*\* DRAFT \*\*\*

**FCC Form 312 Schedule S****Satellite Space Station Authorizations  
(Technical and Operational Description)****General Information**

1. Space Station or Satellite Network Name.....
2. Construction Commencement Date.....
3. Construction Completion Date.....
4. Estimated Launch Date.....
5. Estimated Date of Placement into Service.....
6. Estimated Lifetime of Satellite(s)..... Years
7. Administration Responsible for the station(s).....
8. Other Participating Administrations.....
9. Operating Agency or Company.....
10. Will the space station(s) operate on a Common Carrier basis? ☐ Yes ☐ No
  - 10a. Total number of transponders: \_\_\_\_\_
  - 10b. Total transponder bandwidth (no. transponders x bandwidth) = \_\_\_\_\_ MHz
  - 10c. Number of transponders offered on a noncommon carrier basis: \_\_\_\_\_
  - 10d. Total noncommon carrier transponder bandwidth = \_\_\_\_\_ MHz
11. Orbit Type: ☐ Geostationary Orbit ☐ Non-Geostationary Orbit

**Orbital Information For Geostationary Satellites Only**

12. Nominal Orbital Longitude (Degrees E/W).....
  - 12a. Alternate Orbital Locations (Degrees E/W)....., ....., .....
13. Longitudinal Tolerance or E/W Station-Keeping To West..... Degrees
14. Longitudinal Tolerance or E/W Station-Keeping To East..... Degrees
15. Inclination Excursion or N/S Station-Keeping Tolerance..... Degrees
16. Visibility Arc (Degrees E/W): From West.....  
To East.....
17. Service Arc (Degrees E/W): From West.....  
To East.....

## 18. Total Number of Satellites in Network or System.....

19. Total Number of Orbital Planes in Network or System.....

20. Celestial Reference Body (Earth, Sun, Moon, etc.).....

21. For each Orbital Plane provide:

[illegible]





## 22. Space Station Antenna Beam Characteristics For each antenna beam provide:

[illegible]



**23. Service Area(s) Characteristics** For each service area provide:

[illegible]


**24. Space Station Transponders** For each transponder provide:

[illegible]


\*Transponder gain between output of receiving antenna and input of transmitting antenna.

**25. Typical Emissions** For each planned type of emission provide:

[illegible]


In addition to the information required in this Form, the space station applicant is required to provide all the information specified in Section 25.114 of the Commission's rules, 47 C.F.R. § 25.114.



## Appendix D

### Proposed Revisions to Form 312

#### FCC Form 312EZ Qualification Questions

For purposes of this form, "you" are an applicant for an earth station license. You must be able to answer YES to all of the following questions in order to use this form 312EZ to file an earth station application. If you cannot answer "YES" to any of the following questions cannot be answered "YES", then you must use FCC Form 312.

**01. Application, Frequency Bands, Satellites, and Service:** Are you applying for a NEW earth station license (*i.e.*, one that has not been previously licensed)? Will you operate your proposed earth station ONLY within the C-band (3700-4200 MHz and 5925-6425 MHz) or Ku-band (11.7-12.2 GHz and 14.0-14.5 GHz)? Will you operate your proposed earth station operate ONLY with U.S.-licensed or Permitted List geostationary satellites? Will your proposed earth station be a fixed earth station or temporary-fixed earth station that will operate only in the Fixed Satellite Service on a non-Common Carrier basis?

YES \_\_\_\_\_ NO \_\_\_\_\_

**02. Rules and Waivers:** Does your proposed earth station and its operation conform to all technical, procedural, and operational requirements of the FCC Rules and Regulations (47CFR) and therefore requires NO waivers or exemptions from any of the Commission's Rules?

YES \_\_\_\_\_ NO \_\_\_\_\_

**03. Antenna Standard:** Do(es) your proposed antenna(s) comply with the antenna gain standard specified in Section 25.209(a) and (b) as demonstrated by the manufacturer's qualification measurements?

YES \_\_\_\_\_ NO \_\_\_\_\_

**04. Power Levels:** Does your proposed earth station operation conform with all routine power and power density rules contained in Sections 25.211 and 25.212?

YES \_\_\_\_\_ NO \_\_\_\_\_

**05. Frequency Coordination:** If you will operate your proposed earth station in the C-band (3700-4200 MHz and 5925-6425 MHz), have you completed frequency coordination and attached Frequency Coordination Report to this application?

YES \_\_\_\_\_ NO \_\_\_\_\_

**28. Environmental Policy:** Do you certify that Commission grant of any proposal in this application will NOT have a significant environmental impact as defined by 47 CFR Section 1.1307?

YES \_\_\_\_\_ NO \_\_\_\_\_

**06. Radiation Hazard:** If you are asking for a transmit/receive or transmit-only earth station license, has a Radiation Hazard Study (refer to OET Bulletin 65) been completed and will this Radiation Hazard Study be attached as an exhibit to this application?

YES \_\_\_\_\_ NO \_\_\_\_\_

**07. FAA Notification:** Can you answer "yes" to one or more of the following questions?

a. Have you completed FCC Form 854?

b. Have you attached an FAA study regarding the potential hazard of the structure to aviation as an exhibit to this application?

c. Can you certify that FAA notification is not required under 47 CFR Part 17 and 47 CFR Section 25.113(c)?

YES \_\_\_\_\_ NO \_\_\_\_\_

**29. Alien Ownership:** Can you answer "yes" to all of the following questions?

- a. Do you certify that you are not a foreign government or a representative of a foreign government?
  - b. Do you certify that you are not an alien, or the representative of an alien?
  - c. Do you certify that you are not a corporation organized under the laws of any foreign government?
  - d. Do you certify that you are not a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?
  - e. Do you certify that you are not a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?
- YES \_\_\_\_\_ NO \_\_\_\_\_

**36. Revoked or Denied Authorization:** Do you certify that the applicant or any party to this application has NOT had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license or construction permit denied by the Commission?

YES \_\_\_\_\_ NO \_\_\_\_\_

**37. Felony Conviction:** Do you certify that neither nor any party to this application, nor any party directly or indirectly controlling your company, has EVER been convicted of a felony by any state or federal court?

YES \_\_\_\_\_ NO \_\_\_\_\_

**38. Monopolizing Radio Communication:** Do you certify that NO court has finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition?

YES \_\_\_\_\_ NO \_\_\_\_\_

**39. Pending Matters:** Do you certify that neither you nor any person directly or indirectly controlling the applicant, is not currently a party in any pending matter referred to in the preceding two items?

YES \_\_\_\_\_ NO \_\_\_\_\_

**41. Denial of Federal Benefits:** Does the undersigned certify that neither the applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance? See 47 CFR Section 1.2002(b) for the meaning of "party to the application" for these purposes.

YES \_\_\_\_\_ NO \_\_\_\_\_

**[Note: Questions 28, 29, 36, 37, 38, 39, and 40 are related to questions with the same numbers on the Main Form of FCC Form 312.]**

# APPLICANT INFORMATION

FCC 312-EZ

1. Legal Name of Applicant		2. Voice Telephone Number		FCC Use Only File Number:  Call Sign:  Fee Number:
3. Other Name Used for Doing Business (if any)		4. Fax Telephone Number		
5. Mailing Street Address or P.O. Box		6. City	E-mail Address:	
ATTENTION:		7. State / Country (if not U.S.A.)	8. Zip Code	
9. Name of Contact Representative (If other than applicant)		10. Voice Telephone Number		
11. Firm or Company Name		12. Fax Telephone Number		
13. Mailing Street Address or P.O. Box		14. City	E-mail Address:	
ATTENTION:		15. State / Country (if not U.S.A.)	16. Zip Code	

## TYPE OF APPLICATION, SERVICE, AND STATION

17. Classification of Earth Station filing. Mark only one. <input type="checkbox"/> b1. Application for License of New Station <input type="checkbox"/> b2. Application for Registration of New Domestic Receive-Only Station	20. NATURE OF SERVICE: <input type="checkbox"/> a. Fixed Satellite	21. STATUS: <input type="checkbox"/> b. Non-Common Carrier	22. Satellites to be accessed <input type="checkbox"/> a. Using Only GSO satellites on the Permitted List
24. FREQUENCY BAND(S): Mark all applicable frequency band(s). <input type="checkbox"/> a. C-Band (4/6 GHz) <input type="checkbox"/> b. Ku-Band (12/14 GHz)	25. CLASS OF STATION: Mark only one class. <input type="checkbox"/> a. Fixed Earth Station <input type="checkbox"/> b. Temporary-Fixed Earth Station	26. TYPE OF EARTH STATION FACILITY: Mark only one. <input type="checkbox"/> a. Transmit/Receive <input type="checkbox"/> b. Transmit-Only <input type="checkbox"/> c. Receive-Only	

43. Description. (Summarize the nature of the application and the services to be provided).	Exhibit No.	Identify all exhibits that are attached to this application.

## CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

44. Applicant is a (an): (Place an "X" in the box next to applicable response.) <input type="checkbox"/> a. Individual <input type="checkbox"/> b. Unincorporated Association <input type="checkbox"/> c. Partnership <input type="checkbox"/> d. Corporation <input type="checkbox"/> e. Governmental Entity <input type="checkbox"/> f. Other (Please specify) _____	
45. Typed Name of Person Signing	46. Title of Person Signing
47. Signature	48. Date

**WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).**

**B1. Location of Earth Station Site.** If temporary-fixed specify area of operation and point of contact.**FCC 312-EZ**

B1a. Station Call Sign	B1b. Site Identifier*	B1c. Telephone Number	B1j. Geographic Coordinates Deg - Min - Sec - E/W	B1k. Lat/Lon. Coordinates are: <input type="checkbox"/> NAD-27 <input type="checkbox"/> NAD-83
B1d. Street Address of Station or Area of Operation		B1e. Name of Contact Person		Lat. _____ Lon. _____
B1f. City	B1g. County	B1h. State	B1i. Zip Code	B1l. Site Elevation (AMSL) _____ meters

**B2. Points of Communications:** ALSAT**B3. Destination points for communications using non-U.S. licensed satellites.** N/A**B4. Earth Station Antenna Facilities:**

(a) Site ID*	(b) Antenna ID**	(c) Quantity	(d) Manufacturer	(e) Model	(f) Antenna Size (meters)	(g) Antenna Gain Transmit and/or Receive (____ dBi at ____ GHz)

**B5. Antenna Heights and Maximum Power Limits:** (The corresponding Antenna ID in tables B4 and B5 applies to the same antenna)

(a) Antenna ID**	(b) Antenna Structure Registration No.	Maximum Antenna Height		(e) Building Height Above Ground Level (meters)***	(f) Maximum Antenna Height Above Rooftop (meters)***	(g) Total Input Power at antenna flange (Watts)	(h) Total EIRP for all carriers (dBW)
		(c) Above Ground Level (meters)	(d) Above Mean Sea Level (meters)				

Notes: \* Identify the site (Item B1b) where each antenna is located.

\*\* Identify each antenna in multi-antenna station with a unique identifier, such as A1, A2, 10M, 12M, 7M, etc. Use this same antenna ID throughout tables B4, B5, B6, and B7 when referring to the same antenna.

\*\*\* Attach sketch of site or exemption, See 47 CFR Part 17.

**B6. Frequency Coordination Limits:**

(a) Antenna ID*	(b) Frequency Limits (MHz)	(c) Range of Satellite Arc Eastern Limit**	(d) Range of Satellite Arc Western Limit**	(e) Antenna Elevation Angle Eastern Limit	(f) Antenna Elevation Angle Western Limit	(g) Earth Station Azimuth Angle Eastern Limit	(h) Earth Station Azimuth Angle Western Limit	(i) Maximum EIRP Density toward the Horizon (dBW/4kHz)

Notes: \* Provide the ANTENNA-ID from table B4 to identify the antenna to which each frequency band and orbital arc range is associated.

\*\* For with geostationary satellites, give the orbital arc limits and the associated elevation and azimuth angles.

**B7. Particulars of Operation (Full particulars are required for each r.f. carrier):**

(a) Antenna ID*	(b) Frequency Bands (MHz)	(c) T/R Mode **	(d) Antenna Polarization (H,V,L,R)	(e) Emission Designator	(f) Maximum Power per Carrier (dBW)	(g) Maximum Power Density per Carrier (dBW/4kHz)	(h) Description of Modulation and Services

Notes: \* Provide the ANTENNA-ID from table B4 to identify the antenna to which each frequency band and emission is associated.

\*\* Indicate whether the earth station transmits or receives in each frequency band.

## APPENDIX E

### Technical Analysis for Proposed VSAT Multiple Access Rules

#### I. Introduction

In this Appendix, we explain how we derived the formula in our proposed Section 25.134(a)(1). First, we address the Poisson distribution issue raised in response to Spacenet's petition for declaratory ruling, and then explain how we derived the formula from the Poisson distribution. Subsequently, we explain how we derived the values for N specified in Sections 25.134(a)(1)(i) through (iv).

#### II. The Formula

##### A. Poisson Distribution

In response to Spacenet's petition for declaratory ruling, ALOHA Networks, Inc. claimed that Spacenet erred by basing its calculations on a "Poisson" probability distribution rather than a binomial probability distribution. The Bureau did not reach this issue in its Order, but deferred to this proceeding.<sup>1</sup> Strictly speaking, ALOHA is not a Poisson process. However, because of low numbers, the large number of anticipated VSAT remote stations (e.g. 5000 terminals), and the probability  $P\{k\}$  of occurrence that five or more of those terminals will be simultaneously transmitting is sufficiently small, the characteristics of ALOHA approach the Poisson probability distribution. Furthermore, the academic community has studied the Aloha access technique, and it generally agrees that the Poisson probability distribution is best suited to the Aloha access technique.<sup>2</sup>

##### B. Derivation of Formula

Proposed Section 25.134(a)(1) is as follows:

The maximum transmitter power spectral density of a digital modulated carrier into any GSO FSS earth station antenna shall not exceed  $-14.0 - 10 \log(N)$  dB(W/4 kHz).

Below, we first discuss our derivation of the "-14" term. We then discuss our derivation of the  $10 \log(N)$  term.

The -14 term is based on the Commission's routine licensing rules. In the 1983 *Two Degree Spacing Order*, the Commission determined the maximum power spectral density and minimum earth station antenna size that would allow earth stations to communicate in the Ku-band with a space station located as close as two degrees away from adjacent satellite systems without causing unacceptable interference to those adjacent satellite systems. Later, in the 1987 *VSAT Order*, the Commission's staff supplemented the conclusions of the *Two Degree Spacing Order*, and found that the maximum power spectral density for VSAT remote earth stations in the Ku-band consistent with a two-degree-spacing environment is -14 dBW/4kHz. See 47 C.F.R. § 25.134(a); 1987 *VSAT Order*, 2 FCC Rcd at 2150 (para. 9).

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<sup>1</sup> Spacenet Order at paras. 13-14.

<sup>2</sup> See W. Stallings, *Data and Computer Communications* at 298-99 (2nd ed., 1988); M. Richharia, *Satellite Communications Systems: Design Principles* at 249 (1995).

The  $10 \cdot \log(N)$  term is derived from our conclusion that, when a number of  $N$  earth stations are transmitting to the same space station, in the same frequency band, at the same time, at the maximum power level specified in our two-degree-spacing rules, the combined power radiated to space would be  $N$ -fold of that by a single earth station transmitting continuously by the Rule. As a result, in order to prevent these simultaneous transmissions from causing unacceptable interference to adjacent satellite systems in a two-degree-spacing environment, each earth stations involved would have to reduce power spectral densities in a equal share total to the same amount exceeds the rule limit. The  $10 \cdot \log(N)$  term effectively divides the required total power density reduction equally among the  $N$  earth stations emitting colliding transmissions, so that when the transmissions collide, the total power emission to space cannot exceed  $-14$  dBW/4 kHz, our rule limit.

### III. The $N$ Values

#### A. Summary of Multiple Access Techniques

In summary, there are two types of multiple access techniques that have been developed for VSAT networks. The first type is a "reservation" technique, in which each transmitting earth station operates in a preassigned or predetermined fashion. One example is TDMA, in which each earth station operates only during predetermined times. The second type is a "contention" technique, in which earth stations are allowed to transmit randomly, and there is a possibility that transmissions will collide. We discuss below all the current multiple access techniques and the " $N$ " value we plan to employ in our proposed formula for each technique.

#### B. Reservation TDMA

Time division multiple access (TDMA) is the allocation or the use of the full available bandwidth to every user in the network in sequence of a limited amount of non-over lapping time, called a time slot, in a specific time interval, called TDMA frame period. The summation of the time slots is equal to the time frame period. This time-slotted transmission provides interference isolation between the users within the network. In other words, if we compare a VSAT network to several people in a room, TDMA would assign a particular time for each person to talk.

Proposed Section 25.134(a)(1)(i) sets  $N$  equal to 1 for TDMA networks. Because TDMA guarantees that no more than one remote earth station will transmit at any one time, there is no likelihood of simultaneous transmissions. Therefore, there is no need to require remote earth stations in a VSAT network using TDMA to reduce their power spectral density. In other words, under conventional access techniques such as TDMA (or FDMA), channels are pre-assigned or demand-assigned. This scheme guarantees only one station can transmitting at a time. Thus, we can define  $N=1$ , the maximum power spectral density for each earth station to operate on is

$$\begin{aligned} -14 - 10 \cdot \log(N) &= -14 - 10 \cdot \log(1) \\ &= -14 - 0 \\ &= -14 \quad [\text{dBW/4 kHz}] \end{aligned}$$

#### C. Reservation FDMA

Frequency division multiple access (FDMA) is the allocation of a subband of an available bandwidth to every user in the network. The summation of all subbands is equal to the total available bandwidth. This band segmentation provides the interference isolation between the users in the network.

If we compare a VSAT network to several people in a room, FDMA would assign a particular part of the room to each person. Several conversations could go on simultaneously because each conversation would be limited to a particular part of the room.

Proposed Section 25.134(a)(1)(i) sets  $N$  equal to 1 for FDMA networks. Because TDMA guarantees that no more than one remote earth station will transmit at a given frequency band, there is no likelihood of simultaneous transmissions. Thus, similar to TDMA, there is no need to require remote earth stations in a VSAT network using TDMA to reduce their power spectral density. In other words, under conventional access techniques such as TDMA (or FDMA), channels are pre-assigned or demand-assigned. This scheme guarantees only one station can transmitting at a time. Thus, we can define  $N=1$ , the maximum power spectral density for each earth station to operate on is

$$\begin{aligned} -14 - 10 \cdot \log(N) &= -14 - 10 \cdot \log(1) \\ &= -14 - 0 \\ &= -14 \quad [\text{dBW/4 kHz}] \end{aligned}$$

#### D. Reservation CDMA

In the code division multiple access (CDMA), the entire available bandwidth is allocated to every user for all time. The interference isolation among the users in a network is derived from the modulating digital codes. The number of available distinct digital codes determines the number of simultaneous users in a network. In the room analogy, everyone is allowed to speak at any time, and anywhere in the room, but everyone must use a different language. A listener can focus on one speaker and hear that speaker clearly because other speakers using other languages seem to be background noise.

In a VSAT network using CDMA, several remote earth stations transmit simultaneously. Each transmission is spread over a wider bandwidth, and is transmitted at reduced power. Using wider bandwidth allows each transmission to carry more information. Using lower power levels allows the VSAT network to transmit several messages at the same time without causing interference into other satellite systems.

For VSAT networks using CDMA, proposed Section 25.134(a)(1)(ii) sets  $N$  equal to the likely maximum number of earth stations transmitting simultaneously in the same frequency band in the same satellite receiving beam. Because CDMA allows  $N$  users to transmit signals simultaneously on the same channel, we must ensure that the combining total transmission power will not exceed the max power allowed by the Rule. To prevent from excessive power being transmitted to the channel, we require that total transmission power permitted be equally divided by number of users (*e.g.*,  $N$  users). As a result, the max power spectral density for each transmitting station is

$$-14 - 10 \cdot \log(N) \quad [\text{dBW/4 kHz}]$$

This ensures that the VSAT network as a whole reduces its power spectral density by 3 dB regardless of the number of remote earth stations transmitting simultaneously.

#### E. TDMA/Aloha

Aloha is a random TDMA system. The avoidance of transmission collision (*i.e.*, avoiding mutual interference) depends on the short duration of the transmission and the infrequent activation of transmission. In the room analogy, the people are allowed speak whenever they want, wherever they want, and they all speak the same language. There will be occasions when two people speak at the same time,

but based on statistical probability studies, it can be assumed that it will not happen very often if the number of people allowed to speak at the same time is kept within a certain limit.

In other words, this is a variation of the TDMA multiple access technique, with a contention protocol (ALOHA), which implies that the channel, or the time slot, is not reserved. First, because this is a variation of TDMA, we know that during its time slot, the user acquires the full band and does not share the bandwidth with anyone else. Therefore,  $N = 1$ , and the reduction of the first part is

$$-10 \cdot \log(N) = -10 \cdot \log(1) = 0 \quad [\text{dB}]$$

Second, under the conditions proposed by the Spacenet (Poisson distribution with 38% channel load), we determine that a smaller than 1% probability of carrier collision would be acceptable as a good tradeoff. Based on this condition, we found that likelihood of two-station ( $N=2$ ) colliding is greater than 1% and therefore, a power spectral density adjustment is required. Thus,

$$-10 \cdot \log(N) = -10 \cdot \log(2) = -3 \quad [\text{dB}]$$

Combining the two parts, we obtain max power spectral density for each station in TDMA/ALOHA scheme is

$$-14 + 0 + (-3) = -17 \quad [\text{dBW/4 kHz}]$$

To summarize, proposed Section 25.134(a)(1)(iii) sets  $N$  equal to 2 for VSAT networks using the Aloha multiple access technique. There is a statistically significant probability of two remote earth stations transmitting simultaneously, but the probability of three or more earth stations transmitting simultaneously is not statistically significant. Setting  $N$  equal to two ensures that the power spectral density of two remote earth stations is reduced by 3 dB when those two earth stations are transmitting simultaneously.

#### F. CDMA/Aloha

A VSAT network could also use a combination of the CDMA and Aloha multiple access techniques. In other words, transmissions could be given codes to distinguish them from most other transmissions, and the VSAT network could rely on Aloha-type statistical calculations to keep simultaneous transmissions of signals with the same code within acceptable limits.

We start here as we started in Section III.E. of this Appendix. All users,  $N$ , can transmit simultaneously, so the adjustment for CDMA is

$$-10 \cdot \log(N) \quad [\text{dB}]$$

For the second part, again as it is a contention scheme and we found under the Spacenet's proposed condition, the likelihood of two-station ( $N=2$ ) collision is greater than 1% margin. Therefore, the adjustment for this is

$$-10 \cdot \log(N) = -10 \cdot \log(2) \quad [\text{dB}]$$



Combining the two parts, we have

$$\begin{aligned} -14 - 10 \log(N) - 10 \log(2) &= -14 - (10 \log(N) + 10 \log(2)) \\ &= -14 - 10 \log(2N) \end{aligned}$$

where N is the intended number of simultaneous transmission.

Based on these calculations, our proposed Section 25.134(a)(1)(iv) sets N equal to two times the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite-receiving beam without contention. In other words, this is two for the simple Aloha technique times the N for the CDMA technique in proposed Section 25.134(a)(1)(ii). This ensures that the VSAT network as a whole reduces its power spectral density by 3 dB, regardless of the number of remote earth stations transmitting simultaneously.

## APPENDIX F

### Adoption of Current Power Limits

In 1986, the Commission adopted a routine licensing procedure and technical standards for VSAT networks in our *VSAT Order*.<sup>1</sup> The diameter the of hub station antenna employed at the time the *1986 VSAT Order* was 5 meters or larger. The identical remote antennas were 1.2 meters or larger.<sup>2</sup> We established a maximum outbound downlink EIRP spectral density of +6.0 dBW/4 kHz, a maximum input power spectral density into the VSAT antenna of -14 dBW/4 kHz and a maximum hub EIRP of 78.3 dBW for operation in a digital VSAT network.<sup>3</sup>

A routine licensing procedure and technical standards were adopted for small earth stations providing full transponder service and analog narrowband single channel per carrier (SCPC) services in the *1987 VSAT Order*.<sup>4</sup> The *1987 VSAT Order* established a maximum downlink EIRP power spectral density of +13.0 dBW/4 kHz and a maximum input power spectral density limit of -8.0 dBW/4 kHz with a bandwidth of 200 kHz into a 1.2-meter Ku-band antenna.<sup>5</sup>

In the *1996 Streamlining Order*, the Commission extended the maximum input power limits of Section 25.212 to all other FSS earth stations, regardless of antenna size and signal bandwidth.<sup>6</sup> Under the present rules for Ku-band satellite communications, we authorize earth station antennas 1.2 meters or larger for SCPC services if the maximum power spectral density into the antenna does not exceed +8 dBW/4 kHz in a narrowband analog SCPC carrier, and -14 dBW/4 kHz in a narrowband or wideband digital carrier.<sup>7</sup> Also, under the present rules for C-band communications, we authorize earth station antennas 4.5 meters or larger for SCPC services if the maximum power spectral density into the antenna does not exceed +0.5 dBW/4 kHz in a narrowband analog SCPC carrier, and -2.7 dBW/4 kHz in a narrowband or wideband digital SCPC carrier.<sup>8</sup> The power limits for full transponder service are contained in Section 25.211(d).

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<sup>1</sup> Routine Licensing of Large Networks of Small Antenna Earth Stations Operating in the 12/14 GHz Frequency Bands, 51 Fed. Reg. 15067 (Apr. 22, 1986) (*1986 VSAT Order*). See also 47 C.F.R. §25.134(a).

<sup>2</sup> *1986 VSAT Order*, 51 Fed. Reg. at 15068.

<sup>3</sup> *1986 VSAT Order*, 51 Fed. Reg. at 15068.

<sup>4</sup> Routine Licensing of Earth Stations in the 6 GHz and 14 GHz Bands Using Antennas Less than 9 Meters and 5 Meters in Diameter, Respectively, for Both Full Transponder and Narrowband Transmissions, Declaratory Order, 2 FCC Rcd 2149 (Com. Car. Bur. 1987) (*1987 VSAT Order*). See also 47 C.F.R. §§25.211, 25.212.

<sup>5</sup> *1987 VSAT Order*, 2 FCC Rcd at 2150 (para. 6).

<sup>6</sup> *1996 Streamlining Order*, 11 FCC Rcd at 21596-97 (paras. 38-39).

<sup>7</sup> 47 C.F.R. § 25.212(c).

<sup>8</sup> 47 C.F.R. § 25.212(d).

## APPENDIX G

### Initial Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act (RFA),<sup>1</sup> the Commission has prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities by the policies and rules proposed in this Notice of Proposed Rulemaking. We request written public comments on this IRFA. Commenters must identify their comments as responses to the IRFA and must file the comments by the deadlines for comments on the Notice of Proposed Rulemaking provided above in Section IX. The Commission will send a copy of the Notice of Proposed Rulemaking, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration. *See* 5 U.S.C. § 603(a). In addition, the Notice of Proposed Rulemaking and IRFA (or summaries thereof) will be published in the Federal Register.

#### A. Need for, and Objectives of, the Proposed Rules

The Telecommunications Act of 1996 requires the Commission in every even-numbered year beginning in 1998 to review all regulations that apply to the operations or activities of any provider of telecommunications service and to determine whether any such regulation is no longer necessary in the public interest due to meaningful economic competition.

Our objective is to repeal or modify any rules in Part 61 that are no longer necessary in the public interest, as required by Section 11 of the Communications Act of 1934, as amended.

#### B. Legal Basis

The proposed action is supported by Section 11 of the Communications Act of 1934, as amended, 47 U.S.C. § 161.

#### C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules May Apply

The RFA directs agencies to provide a description of, and, where feasible, an estimate of, the number of small entities that may be affected by the proposed rules, if adopted.<sup>2</sup> The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."<sup>3</sup> In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.<sup>4</sup> A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3)

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<sup>1</sup> *See* 5 U.S.C. § 603. The RFA, *see*, 5 U.S.C. § 601 *et seq.*, has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

<sup>2</sup> 5 U.S.C. § 603(b)(3).

<sup>3</sup> *Id.* § 601(6).

<sup>4</sup> 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register." 5 U.S.C. § 601(3).

satisfies any additional criteria established by the Small Business Administration (SBA).<sup>5</sup> A small organization is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."<sup>6</sup> Nationwide, as of 1992, there were approximately 275,801 small organizations.<sup>7</sup> "Small governmental jurisdiction" generally means "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000."<sup>8</sup> As of 1992, there were approximately 85,006 such jurisdictions in the United States.<sup>9</sup> This number includes 38,978 counties, cities, and towns; of these, 37,566, or 96 percent, have populations of fewer than 50,000.<sup>10</sup> The Census Bureau estimates that this ratio is approximately accurate for all governmental entities. Thus, of the 85,006 governmental entities, we estimate that 81,600 (91 percent) are small entities. Below, we further describe and estimate the number of small entity licensees that may be affected by the proposed rules, if adopted.

**1. Cable Services.** The SBA has developed a definition of small entities for cable and other pay television services, which includes all such companies generating \$11 million or less in revenue annually. This definition includes cable systems operators, closed circuit television services, direct broadcast-satellite services, multipoint distribution systems, satellite master antenna systems and subscription television services. According to the Census Bureau data from 1992, there were 1,788 total cable and other pay television services and 1,423 had less than \$11 million in revenue. The Commission has developed its own definition of a small cable system operator for the purposes of rate regulation. Under the Commission's rules, a "small cable company," is one serving fewer than 400,000 subscribers nationwide<sup>11</sup>. Based on our most recent information, we estimate that there were 1,439 cable operators that qualified as small cable system operators at the end of 1995<sup>12</sup>. Since then, some of those companies may have grown to serve over 400,000 subscribers, and others may have been involved in transactions that caused them to be combined with other cable operators. Consequently, we estimate that there are fewer than 1,439 small entity cable system operators.

The Communications Act also contains a definition of a small cable system operator, which is "a cable operator that, directly or through an affiliate, serves in the aggregate fewer than 1 percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed \$250,000,000."<sup>13</sup> The Commission has determined that there are 66,690,000 subscribers in the United States. Therefore, we found that an operator serving fewer than 666,900 subscribers shall be deemed a small operator, if its annual revenues, when combined with the total annual revenues of all of its affiliates, do not exceed \$250 million in the aggregate.<sup>14</sup> Based on available data, we find that the number of cable operators serving 666,900 subscribers or less totals 1,450.<sup>15</sup> We do not request nor do we collect information concerning whether cable system operators are affiliated with entities whose gross annual revenues exceed \$250,000,000, and thus are unable at this time to estimate

<sup>5</sup> Small Business Act, 15 U.S.C. § 632 (1996).

<sup>6</sup> 5 U.S.C. § 601(4).

<sup>7</sup> 1992 Economic Census, U.S. Bureau of the Census, Table 6 (special tabulation of data under contract to Office of Advocacy of the U.S. Small Business Administration).

<sup>8</sup> 5 U.S.C. § 601(5).

<sup>9</sup> U.S. Dept. of Commerce, Bureau of the Census, "1992 Census of Governments."

<sup>10</sup> *Id.*

<sup>11</sup> 47 C.F.R. § 76.901(e). The Commission developed this definition based on its determination that a small cable system operator is one with annual revenues of \$100 million or less. Implementation of Sections of the 1992 Cable Act: Rate Regulation, Sixth Report and Order and Eleventh Order on Reconsideration. 10 FCC Rcd 7393 (1995), 60 FR 10534 (Feb. 27, 1995).

<sup>12</sup> Paul Kagan Associates, Inc., Cable TV Investor, Feb. 29, 1996 (based on figures for Dec. 30, 1995).

<sup>13</sup> 47 U.S.C. § 543(m)(2).

<sup>14</sup> 47 C.F.R. § 76.1403(b).

<sup>15</sup> Paul Kagan Associates, Inc., Cable TV Investor, Feb. 29, 1996 (based on figures for Dec. 30, 1995).

with greater precision the number of cable system operators that would qualify as small cable operators under the definition in the Communications Act.

2. International Services. The Commission has not developed a definition of small entities applicable to licensees in the international services. Therefore, the applicable definition of small entity is generally the definition under the SBA rules applicable to Communications Services, Not Elsewhere Classified (NEC).<sup>16</sup> This definition provides that a small entity is expressed as one with \$11.0 million or less in annual receipts.<sup>17</sup> According to the Census Bureau, there were a total of 848 communications services providers, NEC, in operation in 1992, and a total of 775 had annual receipts of less than \$9.999 million.<sup>18</sup> The Census report does not provide more precise data.

a. Fixed Satellite Transmit/Receive Earth Stations. Currently there are over 7500 authorized fixed satellite transmit/receive earth stations authorized for use in bands shared with the terrestrial fixed service. We do not request or collect annual revenue information, and thus are unable to estimate the number of the earth stations that would constitute a small business under the SBA definition.

b. Mobile Satellite Earth Station Feeder Links. There are two licensees operating in spectrum shared with terrestrial fixed services. We do not request or collect annual revenue information, and thus are unable to estimate of the number of mobile satellite earth stations that would constitute a small business under the SBA definition.

c. Space Stations (Geostationary). Commission records reveal that there are six space station licensees licensed in spectrum shared on a co-primary basis with the terrestrial fixed service in the C- and Ku-bands. We do not request or collect annual revenue information, and thus are unable to estimate of the number of geostationary space stations that would constitute a small business under the SBA definition.

d. Space Stations (Non-Geostationary). There are four Non-Geostationary Space Station licensees licensed in spectrum shared on a co-primary basis with the terrestrial fixed service in the C- and Ku-bands. We do not request or collect annual revenue information, and thus are unable to estimate of the number of non-geostationary space stations that would constitute a small business under the SBA definition.

3. Auxiliary, Special Broadcast and other program distribution services. This service involves a variety of transmitters, generally used to relay broadcast programming to the public (through translator and booster stations) or within the program distribution chain (from a remote news gathering unit back to the station). The Commission has not developed a definition of small entities applicable to broadcast auxiliary licensees. Therefore, the applicable definition of small entity is the definition under the Small Business Administration (SBA) rules applicable to radio broadcasting stations (SIC 4832) and television broadcasting stations (SIC 4833). These definitions provide that a small entity is one with either \$5.0 million or less in annual receipts for a radio broadcasting station or \$10.5 million in annual receipts for a TV station. 13 C.F.R. § 121.201, SIC CODES 4832 and 4833. There are currently 3,237 FM translators and boosters, 4913 TV translators.<sup>19</sup> The FCC does not collect financial information on any broadcast facility and the Department of Commerce does not collect financial information on these auxiliary

<sup>16</sup> An exception is the Direct Broadcast Satellite (DBS) Service, *infra*.

<sup>17</sup> 13 C.F.R. § 120.121, SIC code 4899.

<sup>18</sup> 1992 Economic Census Industry and Enterprise Receipts Size Report, Table 2D, SIC code 4899 (U.S. Bureau of the Census data under contract to the Office of Advocacy of the U.S. Small Business Administration).

<sup>19</sup> FCC News Release, Broadcast Station Totals as of September 30, 1999, No. 71831 (Jan. 21, 1999).

broadcast facilities. We believe, however, that most, if not all, of these auxiliary facilities could be classified as small businesses by themselves. We also recognize that most translators and boosters are owned by a parent station which, in some cases, would be covered by the revenue definition of small business entity discussed above. These stations would likely have annual revenues that exceed the SBA maximum to be designated as a small business (as noted, either \$5 million for a radio station or \$10.5 million for a TV station). Furthermore, they do not meet the Small Business Act's definition of a "small business concern" because they are not independently owned and operated.

**4. Microwave Services.** Microwave services include common carrier, private operational fixed, and broadcast auxiliary radio services. At present, there are over 13,500 common carrier stations, and approximately 18,000 private operational fixed stations and broadcast auxiliary radio stations in the microwave services in spectrum that is potentially affected by this rulemaking. Additionally, these stations represent the following distinct licensees among the various radio services: LMDS (121), DEMS (2), Common Carrier Fixed (PTP and LTTS) (1028), Private Operational Fixed PTP (1511), and Fixed Broadcast Auxiliary (806).<sup>20</sup> Inasmuch as the Commission has not yet defined a small business with respect to microwave services, we will utilize the SBA's definition applicable to radiotelephone companies -- *i.e.*, an entity with no more than 1,500 persons. 13 C.F.R. § 121.201, SIC CODE 4812. We estimate, for this purpose, that all of the Fixed Microwave licensees (excluding broadcast auxiliary licensees) would qualify as small entities under the SBA definition for radiotelephone companies.

**D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements**

None of the proposed rules in this notice are expected to increase the reporting, record keeping and other compliance requirements of any telecommunications carrier.

**E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered**

The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives: (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.

This Notice solicits comment on alternatives for more efficient processing of non-routine earth station applications and simplifying earth station application forms.

**F. Federal Rules that May Duplicate, Overlap, or Conflict With the Proposed Rules**

None.

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<sup>20</sup> Results of analysis by FCC ULS contractor in July 2000.